PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	16 March 2005 (16-03-2005)
Applicant's or agent's file reference P478 0010	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA2004/001971	16 November 2004 (16-11-2004)	17 November 2003 (17-11-2003)

International Patent Classification (IPC) or both national classification and IPC 7: G01P-5/22

Applicant
PHOTON CONTROL INC. ET AL

1. This opinion contains indications relating to the following items :

[X]	Box No. I	Basis of the opinion
[ ]	Box No. II	Priority
[ ]	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
[ ]	Box No. IV	Lack of unity of invention
[x]	Box No. V	Reasoned statement under Rule 43*bis*.1(a)(I) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.
[ ]	Box No. VI	Certain documents cited
[x]	Box No. VII	Certain defects in the international application
[x]	Box No. VIII	Certain observations on the international application

2. **FURTHER ACTION**
If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/CA *Canadian Intellectual Property Office* *Place du Portage I, C114 - 1st Floor, Box PCT* *50 Victoria Street* *Gatineau, Quebec K1A 0C9* Facsimile No: 001(819)953-2476	Authorized officer Patrick Norman (819) 997-2156

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language which it was filed, unless otherwise indicated under this item.

   [ ] This opinion has been established on the basis of a translation from the original language into the following language _____ ,which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of :

   a. type of material

      [ ] a sequence listing

      [ ] table(s) related to the sequence listing

   b. format of material

      [ ] in written format

      [ ] in computer readable form

   c. time of filing/furnishing

      [ ] contained in the international application as filed.

      [ ] filed together with the international application in computer readable form.

      [ ] furnished subsequently to this Authority for the purposes of search.

3. [ ] In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statement that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments :

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(I) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1 - 21	YES
	Claims	none	NO
Inventive step (IS)	Claims	4 - 8, 11 - 12, 16 - 21	YES
	Claims	1, 2, 3, 9, 10, 13, 14, 15	NO
Industrial applicability (IA)	Claims	1 - 21	YES
	Claims	none	NO

2. Citations and explanations :

The following documents are referred to:

D1 - US4201467
D2 - US4402230
D3 - US6570647
D4 - US4251733

D1 describes an optical flow velocity meter for determing the average flow velocity of flue gases in a smokestack. A laser generates a beam of light which is split in two and passes through optics and then through the smokestack. Scattered light from articles in the smokestack are imaged by optics on the other side of the stack. The beams passing out of the stack are imaged onto two photodetectors after the light is passed through two high pass filters which serve to filter out the light from the gas flow and leave the scattered light from the particles. Cross correlation is performed to determine the transit time between the light beams from which the velocity is calculated . The flow is considered to be multi phase because of the gaseous and solid components, which are separated in the correlation and analysis.

D2 describes an apparatus for measuring flow velocity of individual flow components of a multi phase flow in a pipe. The device functions by using two probes (detectors) spaced apart along the length of the pipe. The probes are designed to detect the spectral energy of a two phase (liquid/gas) flow by detecting frequency information of the phase components. The device may be active or passive, the active type having transmitters of acoustic or optical energy which function with the detector probes. Probes may be either known optical, thermal or acoustic probes but the device is illustrated with acoustic probes. Each probe is connected to an amplifier which splits the signal into two channels, one for liquid phase and one for gas phase. Upstream and downstream filters which are matched to the frequency characteristics of the liquid and gas phase of the flow are attached to each probe. A cross correlator is connected to each channel to determine the transit delay of each of the liquid and gas phases between the two probes from which the velocity of each phase is calculated.

D3 describes an optical flow meter for determining concentrations or velocities in multi phase flows using backscattered, emitted or transmitted light. The device may measure in one or two dimensions using light, radiation or sonic waves. For measuring velocity, the device comprises two measuring heads which contains at least two optical fibers, one for transmitting the light and one for detecting the scattered light intensity. Times of flight are determined by correlating the signals from the two sensor heads and then the phase velocities are calculated using the optical distance between the sensor heads and the times of flight.

D4 describes an optical flow meter for measuring size and velocity of particles in a gas flow. The device consists of a laser which emits a beam that is split into two parallel beams and passed through a measuring chamber through which flows the gas and particles. The device can utilize forward or backward scattered light as well as light scattered at 90°.

continued in supplemental box

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted :

There is a discrepancy between the disclosure and the figures. Page 17, line 20 notes that the quality of the steam as shown in figure 14B is 56% whereas figure 14B notes that the steam quality is 65%.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made :

It is not clear from the disclosure what the distinction is between scattered and deflected light as per claims 1, 9, 11 and 16. This is contrary to Article 5 PCT.

It is not clear in the claims if the multi phase fluid is Liquid/Gas, Liquid/Solid, Gas/Solid or a combination of all three. The independent claims recited measurement of a multi phase fluid, but claims 6, 8 and 16 - 21 note either the vapour or liquid phase. This is contrary to Article 6 PCT.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: box v

NOVELTY:
Claims 1 - 21 meet the requirements of novelty according to PCT Article 33(2). None of the cited documents disclose the features recited in the independent claims 1, 9, 16 or 19.

None of the prior art discloses the use of scattered, deflected and attenuated light as per claims 1 & 9 or scattered and deflected light as per claim 16.

None of the prior art discloses the use of an optical device to calculate the velocity of different phases using a cross correlation function and also to calculate the amount of liquid fraction based on dispersion of signals from the photodetectors as per claims 16 & 19.

Because the independent claims exhibit novelty with regard to the prior art, the dependent claims are also considered to be novel.

INVENTIVE STEP:
D1 discloses the features of claims 1, 2, 3, 9, 10, 13, 14 & 15 with the exception that the device uses only forward scattered and attenuated light whereas the claimed device recites the use of scattered, deflected and attenuated light. However both documents D3 and D4 disclose devices which may use forward, backward or side scattered light. The claims are considered to be obvious because if the devices of D3 and D4 can use either backscattered, forward scattered or side scattered light, then a person of skill in the art would be able to use all three together. Claims 1, 2, 9, 10, 13, 14 and 15 are therefore thought to lack an inventive step having regard to either D1 and D3 or D1 and D4. (PCT Article 33(3))

D2 discloses the features of claims 1, 2, 3, 9, 10, 13, 14 & 15 with the exception that the device uses only forward scattered and attenuated light whereas the claimed device recites the use of scattered, deflected and attenuated light. Also, there is no mention of using collimated light beams in D2. However both documents D3 and D4 disclose devices which may use forward, backward or side scattered light and the light beams are collimated. The claims are considered to be obvious because if the devices of D3 and D4 can use either backscattered, forward scattered or side scattered light, then a person of skill in the art would be able to use all three together and besides this, the use of collimated beams is shown. Claims 1, 2, 3, 9, 10, 13, 14 and 15 are therefore thought to lack an inventive step having regard to either D2 and D3 or D2 and D4. (PCT Article 33(3))

INDUSTRIAL APPLICABILITY:

All of the claims are considered to meet the requirements for industrial applicability. (PCT Article 33(4))